

## Oceanographic Instrument

Environment and Resources Management

**B**elow is a Fast Repetition Rate Fluorometer, an oceanographic instrument being marketed by Environmental Monitoring Systems (EMS) division of MillWest Corporation, Dumas, Texas. The first commercial units were shipped in 1994 to Germany's Alfred Wegener Institute.

Developed under NASA contract, the FRR fluorometer is a computer-controlled instrument for measuring the fluorescence of phytoplankton, the microscopic plant forms that are the major sources of sustenance for animal life in the oceans; such measurements provide scientific information on ocean activity and productivity. The instrument measures the chlorophyll biomass (the total amount of phytoplankton in a water sample) and the parameters of photosynthesis in phytoplankton (photosynthesis is the process by which plant cells produce carbohydrates by absorbing carbon dioxide and water in the presence of chlorophyll and light, and release oxygen as a byproduct). **At right**, Dr. Zbigniew Kolber works with data collected by the sensor, which was lowered into the ocean and towed by ship through an area being simul-

taneously investigated by satellite instruments; test print-outs of FRR fluorometer and satellite data are compared.

Among advantages cited for the Fast Repetition Rate Fluorometer, it is non-destructive and does not harm the microplants, and it can be used *in situ*, eliminating the need to remove a sample from its natural surroundings. The instrument is equipped with a powerful microcomputer, a data logger, an internal battery pack and a flexible communications channel.

The fluorometer was originally designed at Brookhaven National Laboratory, Long Island, New York. Development was begun in 1990 by G. Miller Machine Company, Dumas, Texas, parent company of EMS. In 1992, Jet Propulsion Laboratory awarded the company a NASA Small Business Innovation Research contract to complete the development. Although the fluorometer is technically commercialized, EMS is continuing work on the SBIR contract, refining the electrical components and writing software for incorporation in later versions of the instrument.

